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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/763,365

02/23/2001

Teruo Takizawa

108680

4673

25944 7590 04/23/2003

OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER

HOGANS, DAVID L

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/763,365

Examiner

David L. Hogans

Applicant(s)

TAKIZAWA ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

This Office Action is in response to Amendment D filed on February 26, 2003.

Status of Claims

Claims 1-16 are cancelled. Claims 17-27 are newly added.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 17-20 and 22-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over 6,124,614 to Ryum et al.

Claims 17, 18 and 22-24

Ryum et al., in columns 4-5 lines 10-40 and Figures 3A-3F, teaches a semiconductor device comprising: a silicon substrate (51-1); a gate insulation film (53) on the silicon substrate; a gate electrode (540) on the gate insulation film, the gate electrode including a polycrystalline germanium film on the gate insulation film; wherein impurities are doped into the germanium film.

Ryum et al. discloses the claimed invention except for the impurities being of a p-type and within a concentration range of about 10^{17} to 10^{20} cm⁻³.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the concentration range of impurities, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 (CCPA 1955)

Claims 19, 20 and 25-26

Incorporating all arguments of Claims 17 and 22 and noting that Ryum et al., in column 5 lines 15-40 and Figures 3A-3F, teaches wherein the gate electrode (540) includes a low resistance conductive film comprised of a metal silicide.

Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select a preferred metal silicide, since it has been held to be within the general skill of a worker in the art to select a known material based on its suitability for its intended use. *In re Leshin*, 125 USPQ 416 (CCPA 1960)

3. Claims 21 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over 6,124,614 to Ryum et al. in view of Semiconductor Manufacturing Technology (2001) to Quirk et al.

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Incorporating all arguments of Claims 17, 19, 22 and 25 and noting that Ryum et al. fails to explicitly teach a wherein the multi-layer structure is provided with a polysilicon film in between the germanium film and the low resistance conductive film.

However, Quirk et al., on pages 309-311, teaches a polysilicon film that is covered with a refractory metal. Furthermore, Quirk et al. teaches that when the polysilicon and the refractory metal are alloyed together they form a silicide that exhibits low electrical resistivity (i.e. – polycides reduce the series resistance of an interconnection to a polysilicon gate) and are thermally stable.

It would have been obvious to one of ordinary skill in the art to modify Ryum et al. by incorporating a polysilicon layer beneath the low resistance conductive film, as taught by Quirk et al., to provide a low electrical resistivity silicide contact to a gate.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Hogans whose telephone number is (703) 305-3361. The examiner can normally be reached on M-F (7:30-4:30).


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (703) 308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

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308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

dh


April 16, 2003


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800